

CLAIMS

1. A device for simultaneously reflecting and detecting electromagnetic radiation, comprising
 - a first layer made from electrically conductive material for simultaneously reflecting and absorbing electromagnetic radiation incident at a surface of the layer, wherein said first layer simultaneously separates incident electromagnetic radiation into a reflected part and an unreflected part, the first layer being effective to reflect the electromagnetic radiation of said reflected part away from the device and to absorb the electromagnetic radiation of the unreflected part,
 - a second layer underlying said first layer, made from a material having an electrical property dependent on an intensity of electromagnetic radiation absorbed by said first layer, and
 - a third layer underlying said second layer, made from electrically conductive material, wherein said first layer and said third layer form a first electrode and a second electrode respectively and electrical voltage and/or current measured between the electrodes is responsive to said electrical property and indicative of the intensity of the absorbed electromagnetic radiation.
2. A device according to claim 1, wherein said surface of said first layer is a specularly reflective surface.

3. A device according to claim 1, wherein said surface of said first layer is a diffusively reflective surface.
4. A device according to any of claims 1 to 3 including a fourth layer positioned in front of said first layer and being transparent to incident electromagnetic radiation.
5. A device according to claim 4 wherein said fourth layer is transparent to a particular wavelength range of incident electromagnetic radiation and is effective as a high, low or band pass filter.
6. A device according to claim 4 or claim 5, wherein said fourth layer is at least partially reflective of electromagnetic radiation in one or more band of wavelengths whereby to attenuate intensity of electromagnetic radiation incident at said surface of said first layer.
7. A device according to any one of claims 4 to 6, wherein said fourth layer is a chemically protective layer.
8. A device according to any one of claims 4 to 7, wherein said fourth layer comprises a plurality of layers which, in combination, are effective to achieve a desired additional optical and/or chemical property.

9. A device according to any one of claims 4 to 8, wherein said fourth layer conforms to the shape of said first layer.
10. A device as claimed in any one of claims 1 to 9, having an electrical termination for enabling electrical voltage and/or current measurement at high frequency.
11. A device as claimed in claim 10, wherein said electrical termination is a passive electrically resistive element, of 50 ohms.
12. A device as claimed in claim 10, wherein said electrical termination is an active element with an input impedance ideally matched to the impedance of the device with an output impedance of 50 ohms.
13. A device as claimed in claim 12, wherein said active element is a FET input high frequency preamplifier.
14. A device as claimed in any one of claims 1 to 13, wherein the material of said second layer is a piezo- and/or pyro-electrically active material.
15. A device as claimed in claim 14, wherein the material of said second layer is a piezo-electrically and/or pyro-electrically active polymer.

16. A device as claimed in claim 15, wherein said material is poly(vinylidene difluoride) (PVDF) or the copolymer of poly(vinylidene difluoride)/trifluoroethylene (PVDF/TrFE).

17. A device as claimed in any one of claims 1 to 16 wherein said first, second and third layers are supported in a support surface of an electrically insulating substrate.

18. A device as claimed in claim 17, wherein said support surface has a preformed shape to which said first, second and third layers conform.

19. A device as claimed in claim 18, wherein said support surface is concave.

20. A device as claimed in any one of claims 1 to 16, wherein said third layer has a preformed shape to which said first and second layers conform and which supports said first and second layers.

21. A device as claimed in claim 20, wherein said third layer is concave.

22. A device as claimed in any one of claims 17 to 19 including a printed circuit board (PCB) mounted on a lower surface of said electrically insulating substrate.

23. A device as claimed in claims 20 or 21 including a printed circuit board (PCB)

mounted on a lower surface of said third layer.

24. A device as claimed in claim 22 or 23 including electrical circuitry mounted on the PCB.

25. A device as claimed in claim 24, wherein said electrical circuitry includes preamplifier electronics.

26. A device as claimed in any one of the claims 1 to 25 including screening means for preventing exposure of the device to externally generated radio frequency interference.

27. A device as claimed in claim 26 wherein said screening means comprises a screening can having an aperture by which incident electromagnetic radiation can enter the device and reflected electromagnetic radiation can leave the device.

28. A device as claimed in any one of claims 1 to 27 wherein said first layer is made from one or more metal selected from silver, gold, aluminium and copper.

29. A device as claimed in any of claims 1 to 28 suitable for detecting electromagnetic radiation in the wavelength range from $0.15\mu\text{m}$ to 1.0cm .

30. A device as claimed in any one of claims 1 to 29 wherein said first layer has a thickness in the range from $0.5\mu\text{m}$ to $100\mu\text{m}$.

31. A device as claimed in any one claims 1 to 30 wherein said third layer is segmented to provide a plurality of conductive areas electrically isolated from each other to provide an n-element array, where n is greater than one, and said first layer is a continuous metal layer.

32. A device as claimed in any one claims 1 to 30 wherein said first layer is segmented to provide a plurality of conductive areas electrically isolated from each other to provide an n-element array, where n is greater than one, and said third layer is a continuous metal layer.

33. A device substantially as herein described with reference to the accompanying drawings.